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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,938	09/09/2003	James Robert Champion	FOM-139.01	1614
25181	7590	11/10/2004	EXAMINER	
FOLEY HOAG, LLP				BENSON, WALTER
PATENT GROUP, WORLD TRADE CENTER WEST				
155 SEAPORT BLVD				
BOSTON, MA 02110				2858
ART UNIT				PAPER NUMBER

DATE MAILED: 11/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/657,938	CHAMPION ET AL.	
	Examiner	Art Unit	
	Walter Benson	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
 THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 20 October 2004.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-19 and 21-29 is/are rejected.
- 7) Claim(s) 20 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/9/3, 3/29, 10/20/04</u> | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-29 are presented for examination.

Information Disclosure Statement

2. The information disclosure statement filed 3/29/04 (Cite #AA; FR 2 763 682 A) fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered.

Specification

3. The disclosure is objected to because of the following informalities:
 - (a). the cross references related to the applications cited in the specification must be updated (i.e. update the relevant status with the USPTO serial numbers or patent numbers where appropriate, on page 1, lines 10 and 12).
 - (b). page 14, line 1, item 230 is used to define two different items; digital data processor 230; network 230.
- Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2-4, 6-9, 15, 23-25, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Resnick (US Patent No. 5,910,188 and Resnick hereinafter).

6. As to claims 1 and 23, Resnick discloses a system comprising:

at least one first conductive element [transmitting] in contact with at least one dielectric mismatch boundary (col. 1, lines 57-60);

at least one second conductive element in contact with the at least one dielectric mismatch boundary (col. 1, lines 60-63);

a receiver for receiving an electromagnetic signal from the at least one second conductive element, the received electromagnetic signal being based on an electromagnetic signal transmitted on the at least one first conductive element and being coupled to the at least one second conductive element in response to the at least one dielectric mismatch boundary (Fig. 1; col. 2, lines 31-40 and lines 64-67).

7. As to claims 2 and 24, Resnick discloses a system further comprising:

a third conductive element surrounding at least part of the at least one first and second conductive elements and being connected to a ground plane (36', Fig. 4; col. 4, lines 38-45).

8. As to claim 3, Resnick discloses a system comprising where the at least one first and second conductive elements are positioned substantially parallel to each other and substantially perpendicular to the at least one dielectric mismatch boundary (13, 16', Fig. 1; col. 2, lines 24-29).

9. As to claims 4, 6, and 7, Resnick discloses a system comprising: where the at least one dielectric mismatch boundary corresponds to a region associated with at least one first substance having a first dielectric constant and at least one second substance having a second dielectric constant (col. 2, lines 34-36).

10. As to claim 8, Resnick discloses a system further comprising: a transmitter for forming the electromagnetic signal (col. 2, lines 49-52).

11. As to claims 9 and 25, Resnick discloses a system further comprising: a processing element executing instructions to evaluate the received electromagnetic signal relative to the transmitted electromagnetic signal to determine a characteristic of at least one substance associated with the dielectric mismatch boundary (col. 2, lines 24-37).

12. As to claims 15 and 27, Resnick discloses a system comprising:

where the at least one first and second conductive elements are flexible (col. 5, lines 6-10).

Claim Rejections - 35 USC § 103

13. Claims 5, 10-13, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Resnick in view of Haynes (US Patent No. 6,801,157 and Haynes hereinafter).

Although the system disclosed by Resnick, shows substantial features of the claimed invention (discussed in paragraphs above), it fails to disclose:

where the electromagnetic signal exhibits an ultra-wideband frequency [claim 5];

where the processing element communicates at least one of the attributes of the received electromagnetic signal and the characteristic of the at least one substance to a digital data processing device during a communication session [claim 10];

where the attributes of the received electromagnetic signal relative to the transmitted electromagnetic signal includes a time delay and the characteristic of the at least one substance corresponds to a level of that substance [claims 11, 26];

where the time delay attribute of the received electromagnetic signal relative to the transmitted electromagnetic signal is based, at least in part, on a time differential between signals associated with an equivalent time sampling circuit of the receiver [claim 12];

where the level corresponds to a volume of fluid in at least one of an above-ground storage tank and a below-ground storage tank [claim 13].

Nonetheless, these features are well known in the art and would have been an obvious modification of the system disclosed by Resnick, as evidenced by Haynes.

In an analogous art, Haynes discloses a system where the reflected pluses represent a characteristic of a material being measured having:

where the electromagnetic signal exhibits an ultra-wideband frequency [claim 5] (col. 3, lines 36-39) for high speed low power measurements;

where the processing element communicates at least one of the attributes of the received electromagnetic signal and the characteristic of the at least one substance to a digital data processing device during a communication session [claim 10] (col. 4, lines 43-44) to determine the sample time of the reflected pulse;

where the attributes of the received electromagnetic signal relative to the transmitted electromagnetic signal includes a time delay and the characteristic of the at least one substance corresponds to a level of that substance [claims 11, 26] (col. 4, lines 31-35) to provide data to remote devices and the outside world;

where the time delay attribute of the received electromagnetic signal relative to the transmitted electromagnetic signal is based, at least in part, on a time differential between signals associated with an equivalent time sampling circuit of the receiver [claim 12] (col. 5, lines 35-41) to measure round trip travel time for a pulse;

where the level corresponds to a volume of fluid in at least one of an above-ground storage tank and a below-ground storage tank [claim 13] (col. 1, lines 43-45).

Given the teaching of Haynes, a person having ordinary skill in the art at the time of the invention would have readily recognized the desirability and advantages of modifying Resnick by employing the well known or standard features of a sensor, such as disclosed by Haynes in

order to improve measuring the condition or characteristics of a material and for the purposes discussed above.

14. Claims 14, 16-19 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Resnick in view of Macke, Sr. et al. (US Patent Number 6,137,282 and Macke hereinafter).

Although the system disclosed by Resnick, shows substantial features of the claimed invention (discussed in paragraphs above), it fails to disclose:

where the at least one first and second conductive elements form a parallel conductor transmission line structure [claim 14];

where the at least one first and second conductive elements exhibit quadrilateral cross-sections [claim 16];

where the at least one first and second conductive elements exhibit substantially identical cross-sections [claim 17];

a coupler positioned at the dielectric mismatch boundary for coupling the received electromagnetic signal, size of the received electromagnetic signal being independent of dielectric properties associated with substances forming the dielectric mismatch boundary [claims 18, 28];

where the coupler operates as an electromagnetic shunt path between the at least one first and second conductive elements [claim 19].

In an analogous art, Macke discloses a system where the reflected pulses represent a characteristic or level of a material being measured having:

where the at least one first and second conductive elements form a parallel conductor transmission line structure [claim 14] (col. 4, lines 53-58) to provide for distance measurements; where the at least one first and second conductive elements exhibit quadrilateral cross-sections [claim 16] (304,306, Fig. 4) where the cross section is taken lengthwise; where the at least one first and second conductive elements exhibit substantially identical cross-sections [claim 17] (col. 4, lines 65-67 and col. 5, lines 1-4); a coupler positioned at the dielectric mismatch boundary for coupling the received electromagnetic signal, size of the received electromagnetic signal being independent of dielectric properties associated with substances forming the dielectric mismatch boundary [claims 18, 28] col. 4, lines 65-67 and col. 5, lines 1-4) to couple a slight change in dielectric medium to the receiver 1 circuit; where the coupler operates as an electromagnetic shunt path between the at least one first and second conductive elements [claim 19] (col. 5, lines 4-8).

Given the teaching of Macke, a person having ordinary skill in the art at the time of the invention would have readily recognized the desirability and advantages of modifying Resnick by employing the well known or standard features of a sensor, such as disclosed by Macke in order to improve measuring the distance or characteristics of a material and for the purposes discussed above.

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15. Claims 21, 22, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Resnick in view of Mache as applied to claims 18 and 28 above, and further in view of Lutke (US Patent No. 6,229,476 B1 and Lutke hereinafter).

Although the combine teaching of Resnick and Macke shows substantial features of the claimed invention (discussed in the paragraphs above), it fails to disclose:

a float for positioning the coupler relative to the at least one dielectric mismatch boundary [claims 21 and 29];

where the float includes a buoyant component and a weighted component [claim 22].

In an analogous art, Lutke discloses a system for measuring liquid level having:

a float for positioning the coupler relative to the at least one dielectric mismatch boundary [claims 21 and 29] (col. 4, lines 16-26) to move along the level;

where the float includes a buoyant component and a weighted component [claim 22] (Fig. 3 and Fig. 4; col. 5, lines 7-19).

Given the teaching of Lutke, a person having ordinary skill in the art at the time of the invention would have readily recognized the desirability and advantages of modifying Resnick in view of Macke by employing the well known or standard features of a sensor, such as disclosed by Lutke in order to improve measuring the level or characteristics of a material and for the purposes discussed above.

Allowable Subject Matter

16. Claim 20 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record fails to teach in combination a system where the coupler exhibits a length corresponding to at least one-quarter of a propagation velocity pulse length of the transmitted electromagnetic signal.

Prior Art Made of Record

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- A. Champion (US Patent No. 5,898,308) discloses a system for determining the dielectric constant of a fluid;
- B. Fehrenback et al. (US Patent No. 6,701,783 B2) discloses a method and apparatus for determining the position of the border area between different medium..

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter Benson whose telephone number is (571) 272-2227. The examiner can normally be reached on Mon to Fri 6:30 AM to 4:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on (571) 272-2233. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Walter Benson
Walter Benson
Patent Examiner

November 4, 2004